Claims

[c1] 1. An article comprising a molded body formed from a plastic composition comprising a plastic having an index of refraction of at least 1.4 and a photoluminescent material, wherein the article has a graphic image formed as cuts or protrusions, or both, on a surface thereof to provide a luminescent visual effect in the shape of the graphic image, with the proviso that the article is not a lamp lens or lamp bezel.

[c2] 2. The article of claim 1, wherein the photoluminescent material is an organic fluorescent dye.

[c3] 3. The article of claim 2, wherein the fluorescent dye is included at a concentration of 1 % or less by weight of the plastic.

[c4] 4. The article of claim 3, wherein the fluorescent dye provides a blue or violet visual effect and the fluorescent dye is included at a concentration of 0.5 to 0.001% by weight.

[c5] 5. The article of claim 4, wherein the fluorescent dye is included at a concentration of 0.3 to 0.1% by weight.

[c6] 6.The article of claim 4, wherein the fluorescent dye is included at a concentration of 0.1% to 0.005% by weight.

[c7] 7. The article of claim 3, wherein the fluorescent dye provides a red, orange or green visual effect and the fluorescent dye is included at a concentration of less than 0.0005% by weight.

[c8] 8. The article of claim 7, wherein the fluorescent dye is included at a concentration of 0.0001% to 0.0003% by weight.

[c9] 9. The article of claim 2, wherein the fluorescent dye is selected from the group consisting of perylene derivatives, anthracene derivatives, indigoid and thioindigoid derivatives, imidazole derivatives, naphtalimide derivatives, xanthenes, thioxanthenes, coumarins, rhodamines, (2,5-bis[5-tert-butyl-2-benzoxazolyl]thiophene) and derivatives thereof.

[c10] 10. The article of claim 9, wherein the fluorescent dye is included at a concentration of 1 % or less by weight of the plastic.

[c11] 11. The article of claim 2, wherein the fluorescent dye has a quantum yield of 0.7 or greater.

[c12] 12. The article of claim 11, wherein the fluorescent dye has a quantum yield of 0.9 or greater.

[c13] 13. The article of claim 2, wherein the graphic images is formed from cuts having a depth of from 0.5 to 3 mm or protrusions having a height of from 0.5 to 5 mm or combinations thereof.

[c14] 14. The article of claim 1, wherein the plastic is polycarbonate.

[c15] 15. The article of claim 14, wherein the photoluminescent material is an organic fluorescent dye.

[c16] 16. The article of claim 15, wherein the fluorescent dye is included at a concentration of 1 % or less by weight of the polycarbonate.

[c17] 17. The article of claim 16, wherein the fluorescent dye provides a blue or violet visual effect and the fluorescent dye is included at a concentration of 0.5 to 0.001% by weight.

[c18] 18. The article of claim 17, wherein the fluorescent dye is included at a concentration of 0.3 to 0.1% by weight.

[c19] 19. The article of claim 17, wherein the fluorescent dye is included at a concentration of 0.1 to 0.005% by weight.

[c20] 20. The article of claim 16, wherein the fluorescent dye provides a red, orange or green visual effect and the fluorescent dye is included at a concentration of less than 0.0005% by weight.

[c21] 21. The article of claim 20, wherein the fluorescent dye is included at a concentration of 0.0001% to 0.0003% by weight.

[c22] 22. The article of claim 15, wherein the fluorescent dye is selected from the

group consisting of perylene derivatives, anthracene derivatives, indigoid and thioindigoid derivatives, imidazole derivatives, naphtalimide derivatives, xanthenes, thioxanthenes, coumarins, rhodamines, (2,5-bis[5-tert-butyl-2-benzoxazolyl]thiophene) and derivatives thereof.

[c23] 23. The article of claim 22, wherein the fluorescent dye is included at a concentration of 1 % or less by weight of the polycarbonate.

[c24] 24. The article of claim 1, wherein the molded body has a substantially annular body portion.

[c25] 25. The article of claim 24, wherein the photoluminescent material is a fluorescent dye.

[c26] 26. The article of claim 25, wherein the fluorescent dye is selected from the group consisting of perylene derivatives, anthracene derivatives, indigoid and thioindigoid derivatives, imidazole derivatives, naphtalimide derivatives, xanthenes, thioxanthenes, coumarins, rhodamines, (2,5-bis[5-tert-butyl-2-benzoxazolyl]thiophene) and derivatives thereof.

[c27] 27. The article of claim 26, wherein the fluorescent dye is included at a concentration of 1 % or less by weight of the polycarbonate.

[c28] 28. The article of claim 24, wherein the article is a bottle, having a bottom portion and a sealable top portion.

[c29] 29. The article of claim 28, wherein the bottle has an integrally-molded handle.

[c30] 30. The article of claim 28, wherein the photoluminescent material is a fluorescent dye.

[c31] 31. The article of claim 30, wherein the plastic is a polycarbonate.

[c32] 32. The article of claim 31, wherein the fluorescent dye is selected from the group consisting of perylene derivatives, anthracene derivatives, indigoid and thioindigoid derivatives, imidazole derivatives, naphtalimide derivatives, xanthenes, thioxanthenes, coumarins, rhodamines, (2,5-bis[5-tert-butyl-2-benzoxazolyl]thiophene) and derivatives thereof.

[c33] 33. The article of claim 32, wherein the fluorescent dye included in the article is included at a concentration of 1 % or less by weight of the plastic.

[c34] 34. The article of claim 32, wherein the fluorescent dye in the article provides a blue or violet visual effect and the fluorescent dye is included at a concentration of 0.5 to 0.001% by weight.

[c35] 35. The article of claim 34, wherein the fluorescent dye in the article is included at a concentration of 0.3 to 0.1% by weight.

[c36] 36. The article of claim 34, wherein the fluorescent dye in the article is included at a concentration of 0.1 to 0.005% by weight.

[c37] 37. The article of claim 32, wherein the fluorescent dye in the article provides a red, orange or green visual effect and the fluorescent dye is included at a concentration of less than 0.0005% by weight.

[c38] 38. The article of claim 37, wherein the fluorescent dye in the article is included at a concentration of 0.0001% to 0.0003% by weight.

[c39] 39. The article of claim 24, wherein the graphic images is formed from cuts having a depth of from 0.5 to 3 mm or protrusions having a height of from 0.5 to 5 mm or combinations thereof.

[c40] 40. The article of claim 24, wherein the fluorescent dye has a quantum yield of 0.7 or greater.

[c41] 41. The article of claim 40, wherein the fluorescent dye has a quantum yield of 0.9 or greater.

[c42] 42. The article of claim 1, wherein the article comprises a flat or flattened disc or rectangular body having a major surface on which the graphic image is formed.

[c43] 43. The article of claim 42, wherein the article is selected from the group consisting of key fobs; one or more sides of a box, for example jewelry boxes or lunch boxes; panes for covering pictures; flat panels which can be used in chandeliers or wind chimes, office and desk accessories, including clip boards,

CD cases, rulers, and trays; and window ornaments.

[c44] 44. The article of claim 43, wherein the photoluminescent material is an organic fluorescent dye.

[c45] 45. The article of claim 44, wherein the plastic is a polycarbonate.

[c46] 46. The article of claim 45, wherein the fluorescent dye is included at a concentration of 1 % or less by weight of the plastic.

[c47] 47. The article of claim 46, wherein the fluorescent dye provides a blue or violet visual effect and the fluorescent dye is included at a concentration of 0.5 to 0.001% by weight.

[c48] 48. The article of claim 47, wherein the fluorescent dye is included at a concentration of 0.3 to 0.1% by weight.

[c49] 49.The article of claim 47, wherein the fluorescent dye is included at a concentration of 0.1% to 0.005% by weight.

[c50] 50. The article of claim 46, wherein the fluorescent dye provides a red, orange or green visual effect and the fluorescent dye is included at a concentration of less than 0.0005% by weight.

[c51] 51. The article of claim 50, wherein the fluorescent dye is included at a concentration of 0.0001% to 0.0003% by weight.

[c52] 52. The article of claim 45, wherein the fluorescent dye is selected from the group consisting of perylene derivatives, anthracene derivatives, indigoid and thioindigoid derivatives, imidazole derivatives, naphtalimide derivatives, xanthenes, thioxanthenes, coumarins, rhodamines, (2,5-bis[5-tert-butyl-2-benzoxazolyl]thiophene) and derivatives thereof.

[c53] 53. The article of claim 52, wherein the fluorescent dye is included at a concentration of 1 % or less by weight of the plastic.

[c54] 54. The article of claim 45, wherein the graphic images is formed from cuts having a depth of from 0.5 to 3 mm or protrusions having a height of from 0.5

to 5 mm or combinations thereof.

[c55] 55. The article of claim 1, wherein the article has an irregular shape three dimensional shape with cuts or protrusions formed in the surface thereof to produce a pattern of luminescence that complements the three dimensional shape.

[c56] 56. The article of claim 55, wherein the article is selected from the group consisting of jewelry, beads, buttons, toys, picture frames, eye glasses lenses, eye glass frames, pen barrels, telephones and telephone covers.

[c57] 57. The article of claim 55, wherein the photoluminescent material is a fluorescent dye.

[c58] 58. The article of claim 57, wherein the plastic is a polycarbonate.

[c59] 59. The article of claim 58, wherein the fluorescent dye is selected from the group consisting of perylene derivatives, anthracene derivatives, indigoid and thioindigoid derivatives, imidazole derivatives, naphtalimide derivatives, xanthenes, thioxanthenes, coumarins, rhodamines, (2,5-bis[5-tert-butyl-2-benzoxazolyl]thiophene) and derivatives thereof.

[c60] 60. The article of claim 59, wherein the fluorescent dye included in the article is included at a concentration of 1 % or less by weight of the plastic.

[c61] 61. The article of claim 59, wherein the fluorescent dye in the article provides a blue or violet visual effect and the fluorescent dye is included at a concentration of 0.5 to 0.001% by weight.

[c62] 62. The article of claim 59, wherein the fluorescent dye in the article provides a red, orange or green visual effect and the fluorescent dye is included at a concentration of less than 0.0005% by weight.

[c63] 63. The article of claim 55, wherein the graphic images is formed from cuts having a depth of from 0.5 to 3 mm or protrusions having a height of from 0.5 to 5 mm or combinations thereof.

[c64] 64. The article of claim 1, wherein the photoluminescent material is an organic

nano-particle.

[c65] 65. The article of claim 64, wherein the organic nano-colorant comprises a dye selected from the group consisting of perylene derivatives, anthracene derivatives, indigoid and thioindigoid derivatives, imidazole derivatives, naphtalimide derivatives, xanthenes, thioxanthenes, coumarins, rhodamines, or (2,5-bis[5-tert-butyl-2-benzoxazolyl]thiophene) and all their derivatives .

[c66] 66. The article of claim 65, wherein the plastic is polycarbonate.

[c67] 67. The article of claim 64, wherein the plastic is polycarbonate.

[c68] 68. A method for making an article having a luminescent visual effect in the form of a graphic image, comprising the step of preparing a molding composition comprising a plastic having an index of refraction of at least 1.4 and a photoluminescent material, molding the article from the molding composition, and forming cuts or protrusions, or both, in a surface of the molded article to define the graphic image, wherein the step of forming the cuts or protrusions can occur during or subsequent to the molding step.

[c69] 69. The method of claim 68, wherein the plastic is a polycarbonate.

[c70] 70. The method of claim 69, wherein the photoluminescent material is an organic fluorescent dye.

[c71] 71. The method of claim 70 wherein the fluorescent dye is included at a concentration of 1 % or less by weight of the plastic.

[c72] 72. The method of claim 71, wherein the fluorescent dye is selected from the group consisting of perylene derivatives, anthracene derivatives, indigoid and thioindigoid derivatives, imidazole derivatives, naphtalimide derivatives, xanthenes, thioxanthenes, coumarins, rhodamines, (2,5-bis[5-tert-butyl-2-benzoxazolyl]thiophene) and derivatives thereof.

[c73] 73. The method of claim 68, wherein the graphic images is formed from cuts having a depth of from 0.5 to 3.0 or protrusions having a height of from 0.5 to 5.0 or combinations thereof.

[c74] 74. The method of claim 68, wherein the photoluminescent material is an organic nano-particle.

[c75] 75. The method of claim 74, wherein the organic nano-colorant comprises a dye selected from the group consisting of perylene derivatives, anthracene derivatives, indigoid and thioindigoid derivatives, imidazole derivatives, naphtalimide derivatives, xanthenes, thioxanthenes, coumarins, rhodamines, or (2,5-bis[5-tert-butyl-2-benzoxazolyl]thiophene) and all their derivatives.

[c76] 76. The method of claim 75, wherein the plastic is polycarbonate.

[c77] 77. The method of claim 68, wherein the plastic is polycarbonate.